UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,043	01/18/2006	Yoshiyuki Suzuri	06022/HG	3686

1933 7590 08/18/2009

FRISHAUF, HOLTZ, GOODMAN & CHICK, PC
220 Fifth Avenue
16TH Floor
NEW YORK, NY 10001-7708

EXAMINER	
RALEIGH, DONALD L	
ART UNIT	**PAPER NUMBER**
2879	

MAIL DATE	DELIVERY MODE
08/18/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,043	SUZURI ET AL.	
	Examiner	Art Unit	
	DONALD L. RALEIGH	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/12/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 12, 2009 has been entered.

Response to Amendment

The Amendment, filed on June 12, 2009 has been entered and acknowledged by the Examiner.

Claims 1-46 are pending in the instant application.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6, 8-15 and 23-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 5 and 9 include the limitation "(% by weight)". Because this limitation is placed in parenthesis, it is not clear if this limitation is being claimed exclusively or if it is simply one possible option. Until this limitation is properly incorporated into these claims, it will be considered as one possible option, another option being percent (%) by volume.

The remaining claims are rejected due to their dependency.

Claim Objections

Claims 1-22 are objected to because of the following informalities: All of these claims include the limitation "blocking layer 1" and/or "blocking layer 2". The referenced element numbers should be placed in parenthesis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 16, 24-25, and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (US Patent No. 6,541,909)(previously cited) in view of Thompson et al (US PG Pub. No. 2003/0068528) (previously cited).

Regarding Claim 1, Motomatsu discloses in figure 2, an organic electroluminescent element (abstract, line 1) comprising an anode (2) and a cathode (6)

having therebetween a light emitting layer (4), and hole blocking layer (7) provided adjacent to the light emitting layer (4) and between the light emitting layer and the cathode (6) . Although Motomatsu discloses that the material of the light emitting layer (4) and the hole blocking layer (7) are luminescent which could be phosphorescent, Motomatsu fails to specifically disclose wherein the luminescent layer (4) or the hole blocking layer (7) contain phosphorescent compounds.

In the same field of endeavor, Thompson (528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer (Paragraph [0132], lines 1-2).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

Furthermore, Motomatsu discloses a content of the luminescent compound contained in the hole blocking layer (7) is in the range of 0.1 to 20% of the content of the luminescent compound contained in the light emitting layer (4).

The surface areas of the luminescent layer and the hole blocking layer will be the same but their volumes will be different. The thickness of the luminescent layer is 50 nm (Column 4, lines 30-31) and the thickness of the hole blocking layer (7) is 15 nm (Column 4, line 34). Therefore, the volume of the luminescent layer (4) is 50/15 times

the volume of the hole blocking layer (7) or 3.33 times the volume. The doping of the luminescent layer (4) by volume is 1 to 10% (Column 4, lines 20-21) and the doping of the hole blocking layer (7) is .6 to 6% (Column 4, line 22). Then the amount of material in the hole blocking layer (7) in relation to the amount of material in the luminescent layer (4) will be:

.6 %/(3.33)(1%) to 6%/(3.33)(10%) or .18 (18%) which is within the claimed range.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to substitute the phosphorescent material suggested by Thompson (528), as the luminescent material used by Motomatsu in the emissive and hole blocking layers, to enhance the electron conduction and electron injection properties of the hole blocking layer.

Regarding Claim 3, Motomatsu discloses the organic electroluminescent element wherein the luminescent compound contained in the light emitting layer is the same as the luminescent compound contained in hole blocking layer 1 (Column 4, lines 7-9) but fails to specify that this luminescent compound is phosphorescent.

In the same field of endeavor, Thompson (528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer (Paragraph [0132], lines 1-2).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive

and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

Regarding Claim 16, Motomatsu discloses in figure 2, an organic electroluminescent element (abstract, line 1) comprising an anode (2) and a cathode (6) having therebetween a light emitting layer (4) containing a phosphorescent compound, and hole blocking layer (7) provided adjacent to the light emitting layer (4) and between the light emitting layer (4) and the cathode (6),

Although Motomatsu discloses that the material of the light emitting layer (4) and the hole blocking layer (7) are luminescent which could be phosphorescent, Motomatsu fails to specifically disclose wherein the luminescent layer (4) or the hole blocking layer (7) contain phosphorescent compounds.

In the same field of endeavor, Thompson (528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer (Paragraph [0132], lines 1-2).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

Motomatsu, as modified by Thompson (528) fails to teach wherein an amount of light emitted from hole blocking layer 1 is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer.

Motomatsu, as modified by Thompson (528) discloses the claimed invention except for wherein an amount of light emitted from hole blocking layer 1 is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer.

It is obvious that the amount of light emitted by the hole blocking or light emitting layer is directly related to the choice of material used for these layers and the amount of this material in each layer. This is a determination easily made by one of ordinary skill in the art.

It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to provide an amount of light emitted from hole blocking layer 1 is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claim 24, 25, 36 and 37, Motomatsu discloses a display/illumination comprising the organic electroluminescent element (abstract, line 1).

Claims 2 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu(909) in view of Thompson (528) and further in view of Wolk et al (US PG Pub. No. 002/0197554) (previously cited).

Regarding Claim 2, Motomatsu, as modified by Thompson (528) fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises hole blocking layer 2 provided adjacent to hole blocking layer 1 and between hole blocking layer 1 and the cathode.

In the same field of endeavor, Wolk teaches a transfer layer containing two layers both of which can be a hole blocking layer (Paragraph [0075], lines 1-15) in order that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent hole blocking layers as taught by Wolk into the electroluminescent element of Motomatsu, as modified by Thompson (528), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Regarding Claim 17, Motomatsu, as modified by Thompson (528) fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises hole blocking layer 2 provided adjacent to hole blocking layer 1 and between hole blocking layer 1 and the cathode.

In the same field of endeavor, Wolk teaches a transfer layer containing two layers both of which can be a hole blocking layer (Paragraph [0075], lines 1-15) in order that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent hole blocking layers as taught by Wolk into the electroluminescent element of Motomatsu, as modified by Thompson (528), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson (528) and further in view of Thompson et al (US PG Pub. No. 2003/0059647) (previously cited).

Regarding Claim 4, Motomatsu, as modified by Thompson (528), fails to exemplify the organic electroluminescent element wherein the phosphorescent

compound contained in the light emitting layer is different from the phosphorescent compound contained in hole blocking layer 1.

Thompson (647) teaches the organic electroluminescent element wherein the phosphorescent compound contained in the light emitting layer is different from the phosphorescent compound contained in hole blocking layer 1. (Paragraph [0109], lines 24-27 discloses using Firpic for the hole blocking layer while using CBP doped with $Ir(ppy)_3$ for the emissive layer (light emitting layer) to improve the electron conduction and injection properties of a hole blocking layer (Paragraph [0109], lines 6-9).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the different materials in the light emitting and hole blocking layers, as taught by Thompson (647) in the elements of Motomatsu, as modified by Thompson (528), to allow one to provide a material in the hole blocking layer that would improve the electron conduction and injection properties.

Claims 5, 7 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Motomatsu(909) in view of Kim et al (US PG Pub. No. 2005/0170621) (previously cited).**

Regarding Claim 5, Motomatsu discloses in figure 4, an organic electroluminescent element (abstract, line 1) comprising an anode (2) and a cathode (6)having therebetween a light emitting layer (4) having a content of luminescent compound, and an electron blocking layer (8) provided adjacent to the light emitting layer (4)(Column 6, lines 4-6 discloses that doped layer (8) may function as an electron

blocking layer), and between the light emitting layer (4) and the anode (2), wherein electron blocking layer (8)has a luminescent compound; and a content of the luminescent compound contained in electron blocking layer (8) is in the range of 0.1 to 20% of the content of the luminescent compound contained in the light emitting layer.

In Figure 4, the surface areas of the luminescent layer and the electron blocking layer will be the same but their volumes will be different. The thickness of the luminescent layer is 50 nm (Column 4, lines 30-31) and the thickness of the electron blocking layer (8) is 15 nm (Column 4, line 34)(Column 6, lines 12-15 discloses that the thicknesses of these layers will be the same as in the first embodiment). Therefore, the volume of the luminescent layer (4) is 50/15 times the volume of the electron blocking layer (8) or 3.33 times the volume. The doping of the luminescent layer (4) by volume is 1 to 10% (Column 5, lines 61-62) and the doping of the electron blocking layer (8) is .6 to 6% (Column 5, lines 63-64). Then the amount of material in the electron blocking layer (8) in relation to the amount of material in the luminescent layer (4) will be:

.6 %/(3.33)(1%) to 6%/(3.33)(10%) or .18 (18%) which is within the claimed range.

Motomatsu fails to disclose that the luminescent compounds used are phosphorescent.

In the same field of endeavor, Kim teaches an emissive layer containing a phosphorescent compound and an electron blocking layer with the same compound (Paragraph [0060], lines 20-23 Ir(ppy)3) Using this phosphorescent compound as the luminescent compound of Motomatsu, who uses the same material in both the emissive

and electron blocking layers would result in the claimed structure above. Kim fails to teach why this compound is used.

Kim discloses the claimed invention except for why this material is used.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ir(ppy)3 for these layers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claim 7, Motomatsu, as modified by Thompson (528), discloses in Figure 4, the organic electroluminescent element (abstract, line 1) wherein the luminescent compound contained in the light emitting layer (4) is the same as the luminescent compound contained in electron blocking layer (8)(Column 5, lines 44-48 and Column 6, lines 4-5) but fails to disclose that this compound is phosphorescent.

In the same field of endeavor, Kim teaches an emissive layer containing a phosphorescent compound and an electron blocking layer with the same compound (Paragraph [0060], lines 20-23 Ir(ppy)3) Using this phosphorescent compound as the luminescent compound of Motomatsu, who uses the same material in both the emissive and electron blocking layers would result in the claimed structure above. Kim fails to teach why this compound is used.

Kim discloses the claimed invention except for why this material is used.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ir(ppy)3 for these layers, since it has been held to be within

the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claim 28, Motomatsu discloses a display comprising the organic electroluminescent element (abstract, line 1).

Regarding Claim 29, Motomatsu discloses an illumination device comprising the organic electroluminescent element (abstract, line 1).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu(909) in view of Kim (621) and further in view of Wolk et al (US PG Pub. No. 002/0197554) (previously cited).

Regarding Claim 6, Motomatsu, as modified by Kim (621), fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises electron blocking layer 2 provided adjacent to electron blocking layer 1 and between electron blocking layer 1 and the anode.

In the same field of endeavor, Wolk teaches a transfer layer containing two layers both of which can be an electron blocking layer (Paragraph [0075], lines 1-15) in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent electron blocking layers as taught by Wolk

into the electroluminescent element of Motomatsu, as modified by Kim (621), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Kim (621) and further in view of Thompson et al (US PG Pub. No. 2003/0124381) (previously cited).

Regarding Claim 8, Motomatsu, as modified by Kim (621), fails to exemplify the organic electroluminescent element wherein the phosphorescent compound contained in the light emitting layer is different from the phosphorescent compound contained in electron blocking layer I.

Thompson (381) teaches in Paragraph [0092], line 16 an electron blocking layer comprising Ir(ppy)3 and an emissive layer containing Firpic (Paragraph [0029], lines 4-5).Thompson provides this compound to produce a white light emission from multiple emissive centers (abstract).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the different material layers of Thompson (381) as the luminescent material, in the device of Motomatsu, as modified by Kin (621), in order to produce a white light emission from multiple emissive centers.

Claims, 9, 12, 14, 18, 20, 32-33, 40-41 and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu(909) in view of Thompson(528) and further in view of Kim (621).

Regarding Claim 9, Motomatsu discloses in Figures 2 and 4, an organic electroluminescent element comprising an anode (2) and a cathode (6) having therebetween a light emitting layer (4) having a content of a luminescent compound(Column 4, lines 19-22 discloses that both the luminescent layer (4) and the hole blocking layer (7) are doped. Furthermore, Column 4, lines 38-39 discloses that layer (7) is also a hole blocking layer); hole blocking layer (7)(shown in Figure 2) provided adjacent to the light emitting layer and between the light emitting layer (4) and the cathode (6); and an electron blocking layer (8) provided adjacent to the light emitting layer (4) and between the light emitting layer (4) and the anode (2)(shown in Figure 4. Also, Column 6, lines 15-21 discloses that both doped layers may be present in the same embodiment), wherein hole blocking layer 1 contains a luminescent compound (dopant); a content of the luminescent compound contained in the hole blocking layer 1 is in the range of 0.1 to 20% of the content of the luminescent compound contained in the light emitting layer;

The surface areas of the luminescent layer and the hole blocking layer will be the same but their volumes will be different. The thickness of the luminescent layer is 50 nm (Column 4, lines 30-31) and the thickness of the hole blocking layer (7) is 15 nm (Column 4, line 34). Therefore, the volume of the luminescent layer (4) is 50/15 times the volume of the hole blocking layer (7) or 3.33 times the volume. The doping of the

luminescent layer (4) by volume is 1 to 10% (Column 4, lines 20-21) and the doping of the hole blocking layer (7) is .6 to 6% (Column 4, line 22). Then the amount of material in the hole blocking layer (7) in relation to the amount of material in the luminescent layer (4) will be:

.6 %/(3.33)(1%) to 6%/(3.33)(10%) or .18 (18%) which is within the claimed range.

Motomatsu fails to disclose that the luminescent compound used in the emissive and hole blocking layers is phosphorescent.

In the same field of endeavor, Thompson (528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

Motomatsu discloses in Figure 4, the organic electroluminescent element (abstract, line 1) wherein the luminescent compound contained in the light emitting layer (4) is the same as the luminescent compound contained in electron blocking layer (8)(Column 5, lines 44-48 and Column 6, lines 4-5) .

Motomatsu discloses the electron blocking layer 1 contains a luminescent compound; and a content of the luminescent compound contained in electron blocking layer 1 is in the range of 0.1 to 20% of a content of the luminescent compound contained in the light emitting layer.

In Figure 4, the surface areas of the luminescent layer and the electron blocking layer will be the same but their volumes will be different. The thickness of the luminescent layer is 50 nm (Column 4, lines 30-31) and the thickness of the electron blocking layer (8) is 15 nm (Column 4, line 34)(Column 6, lines 12-15 discloses that the thicknesses of these layers will be the same as in the first embodiment). Therefore, the volume of the luminescent layer (4) is 50/15 times the volume of the electron blocking layer (8) or 3.33 times the volume. The doping of the luminescent layer (4) by volume is 1 to 10% (Column 5, lines 61-62) and the doping of the electron blocking layer (8) is .6 to 6% (Column 5, lines 63-64). Then the amount of material in the electron blocking layer (8) in relation to the amount of material in the luminescent layer (4) will be:

.6 %/(3.33)(1%) to 6%/(3.33)(10%) or .18 (18%) which is within the claimed range. Finally, Column 6, lines 15-21 discloses that both doped layers (hole blocking and electron blocking may be present in the same embodiment.

Motomatsu fails to disclose that the material in the emissive layer and electron blocking layer is phosphorescent.

In the same field of endeavor, Kim teaches an emissive layer containing a phosphorescent compound and an electron blocking layer with the same compound (Paragraph [0060], lines 20-23 Ir(ppy)3) Using this phosphorescent compound as the

luminescent compound of Motomatsu, who uses the same material in both the emissive and electron blocking layers would result in the claimed structure above. Kim fails to teach why this compound is used.

Kim discloses the claimed invention except for why this material is used.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ir(ppy)3 for these layers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claim 12, Motomatsu discloses the organic electroluminescent element wherein the luminescent compound contained in the light emitting layer is the same as the luminescent compound contained in hole blocking layer 1 (Column 4, lines 7-9) but fails to disclose that this material is phosphorescent

In the same field of endeavor, Thompson(528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

Regarding Claim 14, Motomatsu discloses in Figure 4, the organic electroluminescent element (abstract, line 1) wherein the luminescent compound contained in the light emitting layer (4) is the same as the luminescent compound contained in electron blocking layer (8)(Column 5, lines 44-48 and Column 6, lines 4-5) but fails to disclose that this material is phosphorescent.

In the same field of endeavor, Kim teaches an emissive layer containing a phosphorescent compound and an electron blocking layer with the same compound (Paragraph [0060], lines 20-23 Ir(ppy)3) Using this phosphorescent compound as the luminescent compound of Motomatsu, who uses the same material in both the emissive and electron blocking layers would result in the claimed structure above. Kim fails to teach why this compound is used.

Kim discloses the claimed invention except for why this material is used.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ir(ppy)3 for these layers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claim 18, Motomatsu discloses in figures 2 and 4, an organic electroluminescent element comprising an anode (2) and a cathode (6) having therebetween a light emitting layer (4) containing a luminescent compound, and electron blocking layer (8) provided adjacent to the light emitting layer (4) (Column 6, lines 4-6 discloses that doped layer (8) may function as an electron blocking layer) and

between the light emitting layer (4) and the anode (2), wherein electron blocking layer (8) contains a luminescent compound.

Motomatsu fails to disclose that the luminescent compounds used are phosphorescent.

In the same field of endeavor, Thompson (528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer (Paragraph [0132], lines 1-2).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

In the same field of endeavor, Kim teaches an emissive layer containing a phosphorescent compound and an electron blocking layer with the same compound (Paragraph [0060], lines 20-23 Ir(ppy)3). Using this phosphorescent compound as the luminescent compound of Motomatsu, who uses the same material in both the emissive and electron blocking layers would result in the claimed structure above. Kim fails to teach why this compound is used.

Kim discloses the claimed invention except for why this material is used.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ir(ppy)3 for these layers, since it has been held to be within

the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Motomatsu, as modified by Thompson and Kim fail to teach wherein an amount of light emitted from electron blocking layer 1 is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer.

It is obvious that the amount of light emitted by the electron blocking or light emitting layer is directly related to the choice of material used for these layers and the amount of this material in each layer. This is a determination easily made by one of ordinary skill in the art.

It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to provide an amount of light emitted from electron blocking layer is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claim 20, Motomatsu discloses in figures 2 and 4, an organic electroluminescent element comprising an anode (2) and a cathode (6) having therebetween a light emitting layer (4) containing a luminescent compound; hole blocking layer (7) provided adjacent to the light emitting layer (4) and between the light emitting layer (4) and the cathode (6); and electron blocking layer (8) provided adjacent to the light emitting layer (4) and between the light emitting layer (4) and the anode (2),

wherein hole blocking layer (7) contains a luminescent compound and electron blocking layer (8) contains a luminescent compound.

Although Motomatsu discloses that the material of the light emitting layer (4) and the hole blocking layer (7) are luminescent which could be phosphorescent, Motomatsu fails to specifically disclose wherein the luminescent layer (4) or the hole blocking layer (7) contain phosphorescent compounds.

In the same field of endeavor, Thompson (528) teaches using a phosphorescent compound in both the emissive layer and the hole blocking layer (Paragraph [0131], lines 7-12) to enhance the electron conduction and electron injection properties of the hole blocking layer (Paragraph [0132], lines 1-2).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the phosphorescent material in both the emissive and hole blocking layers, as taught by Thompson (528), in the luminescent device of Motomatsu, to enhance the electron conduction and electron injection properties of the hole blocking layer.

In the same field of endeavor, Kim teaches an emissive layer containing a phosphorescent compound and an electron blocking layer with the same compound (Paragraph [0060], lines 20-23 Ir(ppy)3) Using this phosphorescent compound as the luminescent compound of Motomatsu, who uses the same material in both the emissive and electron blocking layers would result in the claimed structure above. Kim fails to teach why this compound is used.

Kim discloses the claimed invention except for why this material is used.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ir(ppy)3 for these layers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Motomatsu, as modified by Thompson (528) and Kim fails to teach that an amount of light emitted from hole blocking layer 1 is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer; and so that an amount of light emitted from electron blocking layer 1 is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer.

It is obvious that the amount of light emitted by the hole blocking layer, the electron blocking layer or light emitting layer is directly related to the choice of material used for these layers and the amount of this material in each layer. This is a determination easily made by one of ordinary skill in the art.

It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to provide an amount of light emitted from hole blocking layer or electron blocking layer is in the range of 0.1 to 50% of an amount of light emitted from the light emitting layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding Claims 32, 40 and 44, Motomatsu discloses a display comprising the organic electroluminescent element (abstract, line 1).

Regarding Claims 33, 41 and 45, Motomatsu discloses an illumination device comprising the organic electroluminescent element (abstract, line 1).

Claims 10-11, 19 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu(909) in view of Thompson (528) and Kim (621) and further in view of Wolk (554).

Regarding Claim 10, Motomatsu, as modified by Thompson (528) and Kim (621), fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises hole blocking layer 2 provided adjacent to hole blocking layer 1 and between hole blocking layer 1 and the cathode.

In the same field of endeavor, Wolk teaches a transfer layer containing two layers both of which can be a hole blocking layer (Paragraph [0075], lines 1-15) in order that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent hole blocking layers as taught by Wolk into the electroluminescent element of Motomatsu, as modified by Thompson (528) and Kim

(621), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Regarding Claim 11, Motomatsu, as modified by Thompson (528) and Kim (621), fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises electron blocking layer 2 provided adjacent to electron blocking layer 1 and between electron blocking layer 1 and the anode.

In the same field of endeavor, Wolk teaches a transfer layer containing two layers both of which can be an electron blocking layer (Paragraph [0075], lines 1-15) in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent electron blocking layers as taught by Wolk into the electroluminescent element of Motomatsu, as modified by Thompson (528) and Kim (621), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Regarding Claims 19 and 22, Motomatsu, as modified by Thompson (528) and Kim(621), fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises electron blocking layer 2 provided

adjacent to electron blocking layer 1 and between electron blocking layer 1 and the anode.

In the same field of endeavor, Wolk (554) teaches a transfer layer containing two layers both of which can be an electron blocking layer (Paragraph [0075], lines 1-15) in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent electron blocking layers as taught by Wolk into the electroluminescent element of Motomatsu, as modified by Thompson (528) and Kim(621), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Regarding Claim 21, Motomatsu, as modified by Thompson (528) and Kim(621), fails to exemplify the organic electroluminescent element wherein the organic electroluminescent element further comprises hole blocking layer 2 provided adjacent to hole blocking layer 1 and between hole blocking layer 1 and the cathode.

In the same field of endeavor, Wolk et al (US PG Pub. No. 002/0197554) teaches a transfer layer containing two layers both of which can be a hole blocking layer (Paragraph [0075], lines 1-15) in order that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during

transfer (Paragraph [0073], lines 1-6). Also, Paragraph [0007], lines 1-6 teaches that the transfer layers are between the anode and the cathode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the two adjacent hole blocking layers as taught by Wolk into the electroluminescent element of Motomatsu, as modified by Thompson (528) and Kim(621), in order to that the important interfacial characteristics of the layers can be produced when the transfer unit is prepared and retained during transfer.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson(528) and Kim(621) and further in view of Thompson et al (US PG Pub. No. 2003/0059647) (previously cited).

Regarding Claim 13, Motomatsu, as modified by Thompson(528) and Kim(621), fails to exemplify the organic electroluminescent element wherein the phosphorescent compound contained in the light emitting layer is different from the phosphorescent compound contained in hole blocking layer 1.

Thompson (647) teaches the organic electroluminescent element wherein the phosphorescent compound contained in the light emitting layer is different from the phosphorescent compound contained in hole blocking layer 1. (Paragraph [0109], lines 24-27 discloses using Firpic for the hole blocking layer while using CBP doped with $Ir(ppy)_3$ for the emissive layer (light emitting layer) to improve the electron conduction and injection properties of a hole blocking layer (Paragraph [0109], lines 6-9).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the different materials in the light emitting and hole

blocking layers, as taught by Thompson (647) in the elements of Motomatsu, as modified by Thompson(528) and Kim(621), to allow one to provide a material in the hole blocking layer that would improve the electron conduction and injection properties.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson (528) and Kim(621) and further in view of Thompson(381).

Regarding Claim 15, Motomatsu, as modified by Thompson (528) and Kim(621), fails to exemplify the organic electroluminescent element wherein the phosphorescent compound contained in the light emitting layer is different from the phosphorescent compound contained in electron blocking layer I.

Thompson (381) teaches in Paragraph [0092], line 16 an electron blocking layer comprising Ir(ppy)3 and an emissive layer containing Firpic (Paragraph [0029], lines 4-5).Thompson provides this compound to produce a white light emission from multiple emissive centers (abstract).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the different material layers of Thompson (381) as the luminescent material, in the device of Motomatsu, as modified by Thompson (528) and Kim(621), in order to produce a white light emission from multiple emissive centers.

Claims 23 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson (528) and further in view of Thompson et al (US Patent No. 6,951,694) (previously cited).

Regarding Claims 23 and 35, Motomatsu, as modified by Thompson (528), fails to exemplify the organic electroluminescent element emitting white light.

In the same field of endeavor, Thompson (694) teaches Column 20, line 40 white light emission that is of high quality and voltage independent.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the white light of Thompson (694) into the electroluminescent element of Motomatsu, as modified by Thompson (528)in order to have a high quality and voltage independent emission.

Claims 26 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson(528) and further in view of Lamansky et al (US PG Pub. No. 2002/0182441) (previously cited).

Regarding Claims 26 and 38, Motomatsu, as modified by Thompson(528), fails to exemplify a display comprising a liquid crystal cell and the illumination device.

Lamansky teaches in (Paragraph [0010], lines 14-15) using illumination devices (organic light emitting devices (line 1)) in liquid crystal displays because of their bright colors, wide viewing angle and low power requirements.(lines 9-12)

It would have been obvious to one of ordinary skills in the art, at the time of the invention, to incorporate the illumination device of Motomatsu in the liquid crystal device

of Lamansky, as modified by Thompson(528), to provide bright colors, wide viewing angle and low power requirements in the liquid crystal device.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Kim(621) and further in view of Thompson (694) .

Regarding Claim 27, Motomatsu, as modified by Kim(621), fails to exemplify the organic electroluminescent element emitting white light.

In the same field of endeavor, Thompson (694) teaches Column 20, line 40 white light emission that is of high quality and voltage independent.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the white light of Thompson (694) into the electroluminescent element of Motomatsu, as modified by Kim(621), in order to have a high quality and voltage independent emission.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Kim (621) and further in view of Lamansky (441).

Regarding Claim 30, Motomatsu, as modified by Kim(621), fails to exemplify a display comprising a liquid crystal cell and the illumination device.

Lamansky teaches in (Paragraph [0010], lines 14-15) using illumination devices (organic light emitting devices (line 1)) in liquid crystal displays because of their bright colors, wide viewing angle and low power requirements.(lines 9-12)

It would have been obvious to one of ordinary skills in the art, at the time of the invention, to incorporate the illumination device of Motomatsu in the liquid crystal device of Lamansky, as modified by Kim(621), to provide bright colors, wide viewing angle and low power requirements in the liquid crystal device.

Claims 31, 39 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson (528) and Kim(621) and further in view of Thompson (694).

Regarding Claims 31, 39 and 43, Motomatsu, as modified by Thompson (528) and Kim(621), fails to exemplify the organic electroluminescent element emitting white light.

In the same field of endeavor, Thompson (694) teaches Column 20, line 40 white light emission that is of high quality and voltage independent.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the white light of Thompson (694) into the electroluminescent element of Motomatsu, as modified by Thompson (528) and Kim(621), in order to have a high quality and voltage independent emission.

Claims 34 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu (909) in view of Thompson(528) and Kim (621) and further in view of Lamansky (441).

Regarding Claims 34 and 42, Motomatsu, as modified by Kim, fails to exemplify a display comprising a liquid crystal cell and the illumination device.

Lamansky teaches in (Paragraph [0010], lines 14-15) using illumination devices (organic light emitting devices (line 1)) in liquid crystal displays because of their bright colors, wide viewing angle and low power requirements.(lines 9-12)

It would have been obvious to one of ordinary skills in the art, at the time of the invention, to incorporate the illumination device of Motomatsu in the liquid crystal device of Lamansky, as modified by Kim, to provide bright colors, wide viewing angle and low power requirements in the liquid crystal device.

Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Motomatsu(909) in view of Lamansky (441).

Regarding Claim 46, Motomatsu fails to exemplify a display comprising a liquid crystal cell and the illumination device.

Lamansky teaches in (Paragraph [0010], lines 14-15) using illumination devices (organic light emitting devices (line 1)) in liquid crystal displays because of their bright colors, wide viewing angle and low power requirements.(lines 9-12)

It would have been obvious to one of ordinary skills in the art, at the time of the invention, to incorporate the illumination device of Motomatsu in the liquid crystal device

of Lamansky to provide bright colors, wide viewing angle and low power requirements in the liquid crystal device.

Response to Arguments

Applicant's arguments with respect to independent **Claims 1, 5 and 9** have been considered but are moot in view of the new ground(s) of rejection. The addition of "(% by weight)" into these claims introduces new issues that must be addressed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DONALD L. RALEIGH whose telephone number is (571)270-3407. The examiner can normally be reached on Monday-Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Donald L Raleigh/
Examiner, Art Unit 2879

/Peter J Macchiarolo/
Primary Examiner, Art Unit 2879